

-- REMARKS --

The present amendment replies to a Non-Final Office Action dated June 14, 2005. Claims 1-20 are currently pending in the present application. Claims 1 and 14 have been amended herein. In the Non-Final Office Action, the Examiner rejected claims 1-9 and 11-20 on various grounds and found claim 10 allowable if rewritten in independent form. The Applicant responds to each ground of rejection as subsequently recited herein and request reconsideration of the present application.

A. Claim 1 was objected to for informalities..

The Examiner objected to an informality in claim 1 in the phrases "one of the locations" and "the other of the locations." Claim 1 has been amended herein to correct any informality and not to avoid any cited reference. The Applicant respectfully requests withdrawal of the objection to claim 1.

B. Claims 1-7 were rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,351,262 to *Poguntke, et al.*

The Applicant has thoroughly considered the Examiner's remarks concerning patentability of the claims over U.S. Patent No. 5,351,262 to *Poguntke, et al.* (the "*Poguntke* patent"). The Applicant has also thoroughly read the *Poguntke* patent. The Applicant respectfully asserts that the *Poguntke* patent fails to include each and every element of the Applicant's invention as claimed, as required to maintain a rejection under 35 U.S.C. §102(b). *See* MPEP 2131. The Applicant asserts that the *Poguntke* patent fails to disclose, teach, or suggest an optical coupler including a diffractive optical element structured to receive incident light diverging from a first location and to focus the incident light at a second location opposite the first location across the diffractive optical element, as recited in amended independent claim 1.

The *Poguntke* patent discloses an integrated multi-wavelength laser with interior ends 20 of the active stripes 14, an interior end 22 of the output waveguide 16, and the diffraction grating 18 formed in a Rowland-circle focusing geometry. *See* column 3, lines 57-65. In the Rowland-circle focusing geometry, the interior ends 20 of the active stripes 14 and the interior end 22 of the output waveguide 16 must be located on the Rowland circle 30. *See* FIG. 3; column 4, lines 27-33. Therefore, the interior ends 20 of the active stripes 14 and the interior end 22 of the output waveguide 16 cannot be located opposite each other across the diffraction grating 18. Withdrawal of the rejection of amended independent claim 1 under 35 U.S.C. §102(b) is respectfully requested.

Regarding claims 3 and 5, the Applicant respectfully submits that the Examiner is mistaken in concluding that the diffractive grating 18 of the *Poguntke* patent defines a plane. The grating 18 has a radius R and is necessarily curved to form a functional Rowland-circle focusing geometry. *See* column 4, lines 17-24; FIGS. 2 and 3. The cross-section 6 is at an arbitrary location on the diffractive grating 18 for purposes of illustration and does not identify any particular plane. Withdrawal of the rejection of claims 3 and 5 under 35 U.S.C. §102(b) is respectfully requested.

Regarding claims 4 and 6, the Applicant respectfully submits that the Examiner is mistaken in concluding that the active waveguide of the *Poguntke* patent is formed on a pedestal. The multiple quantum-well (MQW) layer 56 of the array stripe 14 is supported on the core layer 54, not on a pedestal. *See* FIG. 4; column 5, line 67 through column 6, line 2. Withdrawal of the rejection of claims 4 and 6 under 35 U.S.C. §102(b) is respectfully requested.

In addition to the above, claims 2-7 depend directly or indirectly from amended independent claim 1. Therefore, the dependent claims include all the elements and limitations of the amended independent claim 1. The Applicant therefore respectfully submits that dependent claims 2-7 are allowable over the *Poguntke* patent for at least the same reasons as set forth above for the amended independent claim 1. Withdrawal of the rejection of dependent claims 2-7 under 35 U.S.C. §102(b) is respectfully requested.

- C. Claims 1, 8, and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,774,987 to *Boivin* in view of U.S. Patent No. 4,466,696 to *Carney*.

The Applicant has thoroughly considered the Examiner's remarks concerning patentability of the claims over U.S. Patent No. 3,774,987 to *Boivin* (the "*Boivin* patent") in view of U.S. Patent No. 4,466,696 to *Carney* (the "*Carney* patent"). The Applicant have also thoroughly read the *Boivin* and *Carney* patents. The Applicant respectfully asserts that the *Boivin* and *Carney* patents, alone or in combination, fail to teach or suggest all the elements of the claimed invention. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03. The *Boivin* and *Carney* patents fail to disclose, teach, or suggest a diffractive optical element structured to receive incident light diverging from a first location and to focus the incident light at a second location opposite the first location across the diffractive optical element, as recited in amended independent claim 1.

The *Boivin* patent discloses a coupler 11, providing the example of a grating, coupling a laser beam 10 into a planar waveguide 12 through a planar waveguide 12. See FIG. 1; column 1, lines 58-62. However, the coupler 11 is not structured to focus the incident light. After the laser beam 10 is coupled into the waveguide 12 by the grating 11, the beam is focused by internal reflection within the waveguide. See column 2, lines 7-9. The *Boivin* patent discloses alternative forms of focusing, but all use additional features and none use the grating. See FIGS. 3-5; column 2, lines 13-44. The *Carney* patent does not disclose a grating or any other diffractive optical element.

The *Boivin* and *Carney* patents teach away from the Applicant's invention by their emphasis on the importance of aligning a laser with the core of an optical fiber. The *Boivin* patent states that the alignment of the fibre core 15 with the waveguide 12 is very important. See column 3, lines 56-57. The *Carney* patent discusses problems in achieving critical alignment in the prior art and states that the critical alignment is done during a photolithographic process so there is never a problem of adjusting the position of the fiber with

respect to the emitting region. *See* column 1, line 8 through column 2, line 11; column 3, lines 10-17. The Applicant's invention provides an optical coupling that is relatively insensitive to alignment of the optical source and the optical waveguide. *See* page 4, lines 4-6. Therefore, the *Boivin* and *Carney* patents teach away from the Applicant's invention by improving ways to achieve critical alignment, rather than ways to make the alignment unimportant.

Withdrawal of the rejection of amended independent claim 1 under 35 U.S.C. §103(a) is respectfully requested.

Regarding claim 8, the *Boivin* and *Carney* patents, alone or in combination, fail to disclose, teach, or suggest an electro-optical device having a device optical axis and being mounted with the device optical axis parallel to the plane of the diffractive optical element, as recited in claim 8. The plane of the grating 11 in the *Boivin* patent is parallel the upper surface of the substrate 16. The optical axis of the laser (not shown) emitting laser beam 10 is along the direction of the laser beam 10. Therefore, the optical axis of the laser is not parallel the plane of the grating 11. *See* FIG. 1. The *Carney* patent does not disclose a grating or any other diffractive optical element. Withdrawal of the rejection of claim 8 under 35 U.S.C. §103(a) is respectfully requested.

Regarding claim 13, the *Boivin* and *Carney* patents, alone or in combination, fail to disclose, teach, or suggest the first location and the second location defining a line parallel to and offset from a plane defined by the diffractive optical element, as recited in claim 13. The plane of the grating 11 in the *Boivin* patent is parallel the upper surface of the substrate 16. The laser (not shown) emitting laser beam 10 is above the upper surface of the substrate 16. Therefore, the line between the laser and the optical fibre core 15 is not parallel to and offset from the plane of the grating 11. *See* FIG. 1. The *Carney* patent does not disclose a grating or any other diffractive optical element. Withdrawal of the rejection of claim 13 under 35 U.S.C. §103(a) is respectfully requested.

Claims 8 and 13 depend directly from amended independent claim 1 and include all the elements and limitations of amended independent claim 1. Therefore, claims 8 and 13 are allowable over the *Boivin* and *Carney* patents for at least the same reasons as set forth above for amended independent claim 1. Withdrawal of the rejection of claims 8 and 13 under 35 U.S.C. §103(a) as being unpatentable over the *Boivin* and *Carney* patents is respectfully requested.

- D. Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,351,262 to *Poguntke, et al.* in view of U.S. Patent No. 5,978,139 to *Hatakoshi, et al.*

The Applicant has thoroughly considered the Examiner's remarks concerning patentability of the claims over U.S. Patent 5,351,262 to *Poguntke, et al.* (the "*Poguntke* patent") in view of U.S. Patent No. 5,978,139 to *Hatakoshi, et al.* (the "*Hatakoshi* patent"). The Applicant have also thoroughly read the *Poguntke* and *Hatakoshi* patents. The Applicant respectfully asserts that the *Poguntke* and *Hatakoshi* patents, alone or in combination, fail to teach or suggest all the elements of the claimed invention. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03.

As discussed in Section B above, the *Poguntke* patent fails to disclose, teach, or suggest an optical coupler including a diffractive optical element structured to receive incident light diverging from a first location and to focus the incident light at a second location opposite the first location across the diffractive optical element, as recited in amended independent claim 1. The *Hatakoshi* patent also fails to disclose, teach, or suggest this element. Claim 9 depends from amended independent claim 1 and is allowable for at least the same reasons as amended independent claim 1. Withdrawal of the rejection of claim 9 under 35 U.S.C. §103(a) as being unpatentable over the *Poguntke* and *Hatakoshi* patents is respectfully requested.

- E. Claims 11 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,351,262 to *Poguntke, et al.* in view of U.S. Patent No. 5,082,629 to *Burgess, Jr., et al.*

The Applicant has thoroughly considered the Examiner's remarks concerning patentability of the claims over U.S. Patent 5,351,262 to *Poguntke, et al.* (the "*Poguntke* patent") in view of U.S. Patent No. 5,082,629 to *Burgess, Jr., et al.* (the "*Burgess* patent"). The Applicant has also thoroughly read the *Poguntke* and *Burgess* patents. The Applicant respectfully asserts that the *Poguntke* and *Burgess* patents, alone or in combination, fail to teach or suggest all the elements of the claimed invention. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03.

As discussed in Section B above, the *Poguntke* patent fails to disclose, teach, or suggest an optical coupler including a diffractive optical element structured to receive incident light diverging from a first location and to focus the incident light at a second location opposite the first location across the diffractive optical element, as recited in amended independent claim 1. The *Burgess* patent also fails to disclose, teach, or suggest this element. Claims 11 and 12 depend from amended independent claim 1 and are allowable for at least the same reasons as amended independent claim 1.

In addition, the *Poguntke* and *Burgess* patents solve different problems, so there is no motivation to combine them. The *Poguntke* patent addresses the problem of multiple lasers integrated on a single integrated circuit chip for economy and ease of operation. See column 1, lines 28-30. The *Burgess* patent addresses the problem of improved chemical sensing devices to continuously and reliably measure a particular analyte or analytes in a process stream. See column 1, lines 28-30. Because the nature of the problem to be solved in the *Poguntke* and *Burgess* patents is different, there is no motivation to combine the *Poguntke* and *Burgess* patents. See MPEP 2143.01.

Withdrawal of the rejection of claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over the *Poguntke* and *Burgess* patents is respectfully requested.

- F. Claims 14-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,351,262 to *Poguntke, et al.* in view of U.S. Patent No. 5,082,629 to *Burgess, Jr., et al.*

The Applicant has thoroughly considered the Examiner's remarks concerning patentability of the claims over U.S. Patent 5,351,262 to *Poguntke, et al.* (the "*Poguntke* patent") in view of U.S. Patent No. 5,082,629 to *Burgess, Jr., et al.* (the "*Burgess* patent"). The Applicant has also thoroughly read the *Poguntke* and *Burgess* patents. The Applicant respectfully asserts that the *Poguntke* and *Burgess* patents, alone or in combination, fail to teach or suggest all the elements of the claimed invention. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03.

Regarding claim 14, the *Poguntke* and *Burgess* patents, alone or in combination, fail to disclose, teach, or suggest an optical coupling method including receiving focused, diffracted light across the diffractive optical element, as recited in amended independent claim 14. Withdrawal of the rejection of amended independent claim 14 under 35 U.S.C. §103(a) is respectfully requested.

Regarding claim 15, the *Poguntke* and *Burgess* patents, alone or in combination, fail to disclose, teach, or suggest a method of manufacturing an optical coupling including etching a substrate to form a recessed surface adjacent a front facet and defining a diffractive optical element in the recessed surface, as recited in independent claim 15. The *Poguntke* patent discloses a trench 68 with grating 18 including a reflective layer 74 on a vertical wall 70, but the vertical wall 70 is not a recessed surface. See FIG. 6; column 6, lines 52-60. The recessed surface 22 as defined in the Applicant's invention is the bottom surface of the well 41, as distinguished from the sidewall 25. See FIGS. 1, 5, 6, 7, 8; page 4, lines 15-22. While the specification is not to be read into the claims, the verbiage of the claims must be considered to possess their ordinary usage as would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification. See MPEP 2111. The *Burgess*

patent does not disclose a diffractive optical element in a recessed surface of a substrate, or a method of manufacturing the same. Withdrawal of the rejection of independent claim 15 under 35 U.S.C. §103(a) is respectfully requested.

Claims 16-20 depend directly or indirectly from independent claim 15 and include all the elements and limitations of independent claim 15. Claims 16-20 are allowable for at least the same reasons discussed above for independent claim 15. Withdrawal of the rejection of claims 16-20 under 35 U.S.C. §103(a) is respectfully requested.

G. Claim 10 was objected to, but found allowable if rewritten in independent form.

The Examiner objected to claim 10 as being dependent on a rejected base claim, but found claim 10 allowable if rewritten in independent form. Claim 10 depends directly from independent claim 1 and includes all the elements and limitations of independent claim 1. Claim 10 is allowable for at least the same reasons discussed in Section B above for independent claim 1. Withdrawal of the objection of claim 10 is respectfully requested.


SUMMARY

Reconsideration of the rejection of claims 1-9 and 11-20, and objection to claim 10, is requested in light of the remarks herein. The Applicant submits that claims 1-20 as set forth fully satisfy the requirements of 35 U.S.C. §§102, 103, and 112. In view of foregoing remarks, favorable consideration and early passage to issue of the present application are respectfully requested.

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Respectfully submitted,

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